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In elementary school, the purpose of the program was to assist in attaining the goals which were set up for the over-all curriculum of the modern elementary educational program. Through group activities the program helped students understand the practical nature of the theory in areas such as communicative arts, social studies, mathematics, and science. Activities used included those involved with carrying out an industrial process such as making of paper. They also included the construction of mechanical projects such as puppets, and the construction of non-mechanical projects such as the making of costumes.

The junior high school program offered students an opportunity to work in a number of different industrial arts areas to assist them in locating and developing the aptitudes and industrial interests they may have for technical work. The five areas now used were general drafing, general woodworking, general electricity, general metals, and general power mechanics.

The senior high school program encompassed the basic ideas of general education and also provided the students with an opportunity to specialize toward pre-vocational, pre-technical, and pre-engineering work. The courses offered were drafting (I,II,III,IV), engineering technology (drafting), woodworking (I,II,III,IV), electricity (I,II,III), engineering technology (electricity), metalworking (I,II,III,IV), engineering technology (metalworking), printing (I,II), and auto mechanics (I,II).

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INDUSTRIAL ARTS

Handbook

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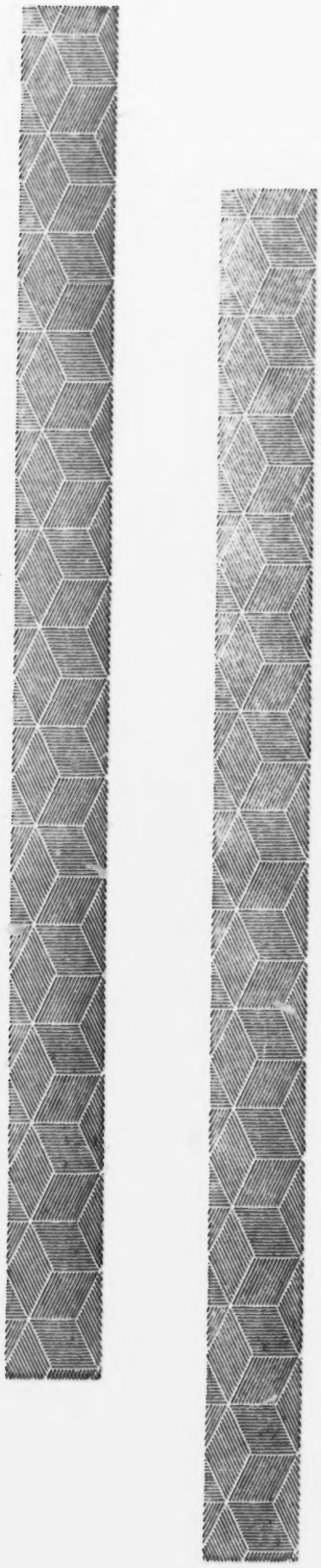
WAUSAU DISTRICT PUBLIC SCHOOLS
WAUSAU, WISCONSIN

INDUSTRIAL ARTS
Handbook



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WAUSAU, WISCONSIN

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INDUSTRIAL ARTS DEPARTMENT
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FOREWORD

Sensing the need for a detailed description of the various courses which are offered in Industrial Arts in the Wausau District Public Schools, the members of the department have responded by preparing this booklet. It is designed, primarily, to answer the many questions which students have concerning the specific subjects in this area of our program.

One of the basic reasons for Wausau Schools being characterized and classified as comprehensive is the broad program of studies which they offer. In addition to the prescribed subjects, students have the privilege of selecting from a wide range of electives. Sometimes it is difficult to know which subjects will best serve each individual student. This guide book should aid the student in making a wise choice in Industrial Arts in keeping with his interest and ability.

I commend the members of the committee for their efforts in developing this informative and well-organized course description booklet. It is another attempt by the Wausau School System to meet the essential needs of its youth.

G. W. Bannerman
Superintendent of Schools
Wausau, Wisconsin

PURPOSE OF THE HANDBOOK

This handbook has been compiled for the purpose of aiding teachers, guidance counselors, and administrators in their programming of students. The brief purposes and course descriptions try to give both the homeroom teachers (or program counselors) and the students an over-all view of what is being offered in the field of industrial arts. Courses varying from elementary or exploratory phases of industrial arts to the pre-vocational, pre-technical, and pre-engineering phases are explained in this handbook. Students are encouraged to use this book when discussing programming problems with their parents.

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* * * * * * * * * * *

The chairman gratefully acknowledges the cooperation and valuable contributions of the industrial arts teachers in the compilation of this handbook and expresses appreciation to Margaret Zielsdorf, Director of English, Wausau District Public Schools, for her assistance in proofreading.

* * * * * * * * * * *

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THE WAUSAU DISTRICT PUBLIC SCHOOLS' PHILOSOPHY OF EDUCATION

We believe that every human being is inherently valuable and therefore has the right to all the help that can be given him in achieving his best development.

We must constantly strive to help each child mature physically, so that he will have a strong body; mentally, so that he will be an independent thinker; morally, so that he will be tolerant of the beliefs of others; and socially, so that he will be cooperative and able to live with others.

By active cooperation among the schools, home, and community we shall try to inspire a greater appreciation for the democratic way, coupled with a desire to preserve that way through intelligent living, active participation, and selfless contribution.

* * * * * * * * * * *

Developed and Adopted by the Wausau teachers

Introduction

INTRODUCTION

A program of public education obtains its orientation and its basic purposes from the society in which the program functions. Stated differently, an educational system always bears a "date" or a "place"--it is the instrument of a given society at a given time and is intended to meet the persistent needs of the society. The school, in turn, gets its direction from these broad social purposes and ideals.

Part of the educational effort in the United States is exerted in the direction of developing within the national community common values, skills, understandings and appreciations based upon the fundamental tenets of democracy. This aspect of the educational program is now referred to as general education. Similarly, a part of the educational effort is exerted in those areas where individuals seek to formulate designated insights or to develop specific potentialities to a higher level of proficiency. This aspect of education is now referred to as special education. Industrial education is a part of special education as industrial arts is a part of general education; therefore, it is impossible to maintain a sharp delineation between general education and special education as it is quite obvious that a complex society, such as ours, needs both.

If we subscribe to the postulate that a major purpose of education is to transmit a way of life, then the industrial arts must become a part of the total education program so as to reflect today's complex industrial life. From the earliest time to the present--even more so in the future--man will need to work with tools, materials, and machines.

WHAT IS INDUSTRIAL ARTS?

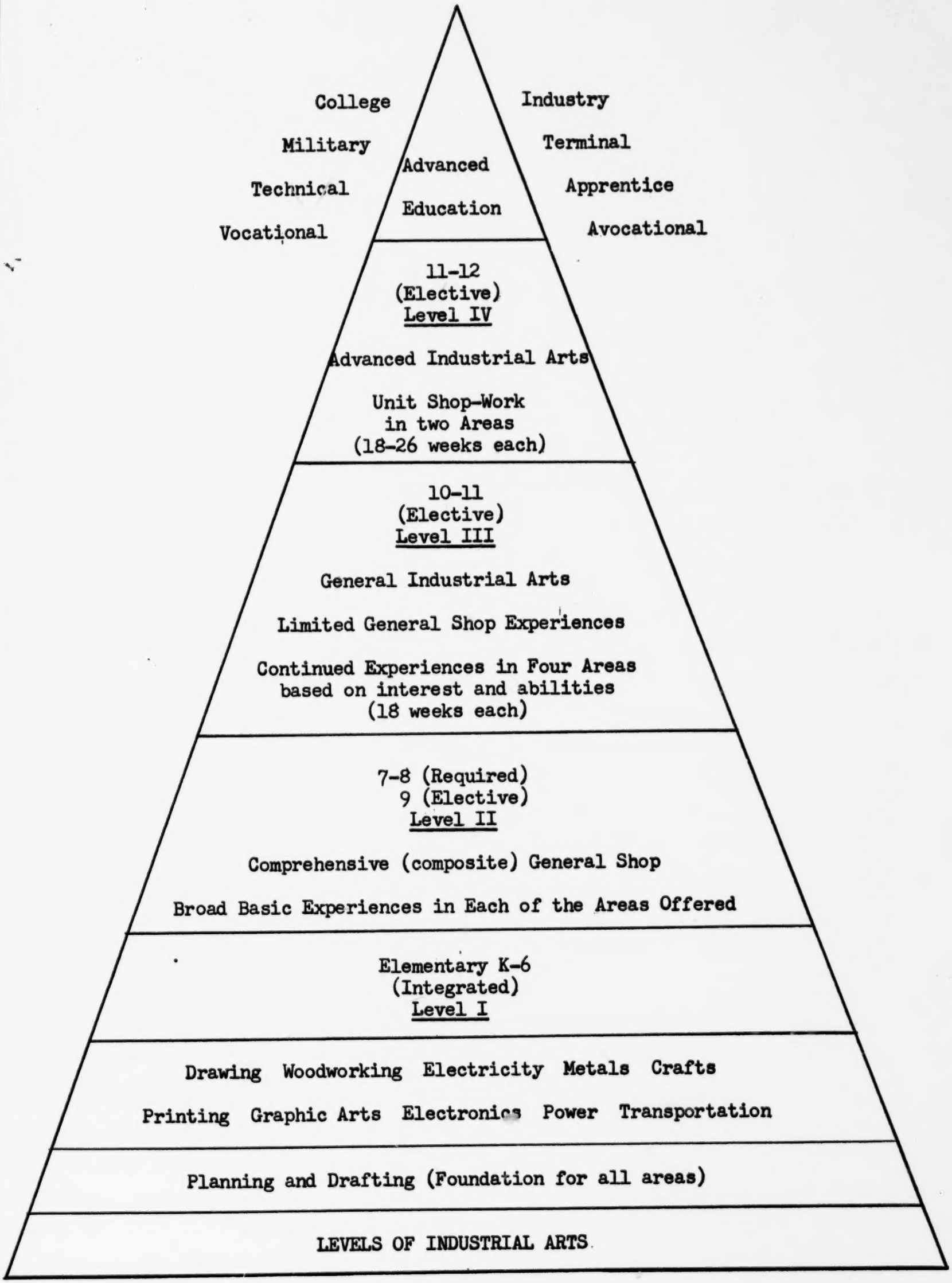
Industrial arts, as a part of everyone's general education, is a study of the tools, materials, processes, products, and occupations of our industrial society. It deals with industry, its organization, and the problems that result from the industrial nature of our society. It teaches students how to design, plan, and do problem solving in which the common materials of industry such as metal, wood, plastic, and other items are employed. It teaches basic hand and machine skills that are useful to everyone whether for vocational competencies or for recreational purposes. It is directly concerned with all phases of conservation. It serves as a foundation for a wide variety of jobs in the world of work such as service occupations, technical occupations, and trade apprenticeships as well as for handy man activities in the home. It develops in the students the ability to perform fundamental tool processes in various fields such as metalworking, woodworking, drafting, plastics, graphic arts, power mechanics, and electricity, and provides an atmosphere of activity where they learn to work in harmony with other people. Industrial arts provides an opportunity for students to discover their aptitudes and abilities in the various fields of technology.

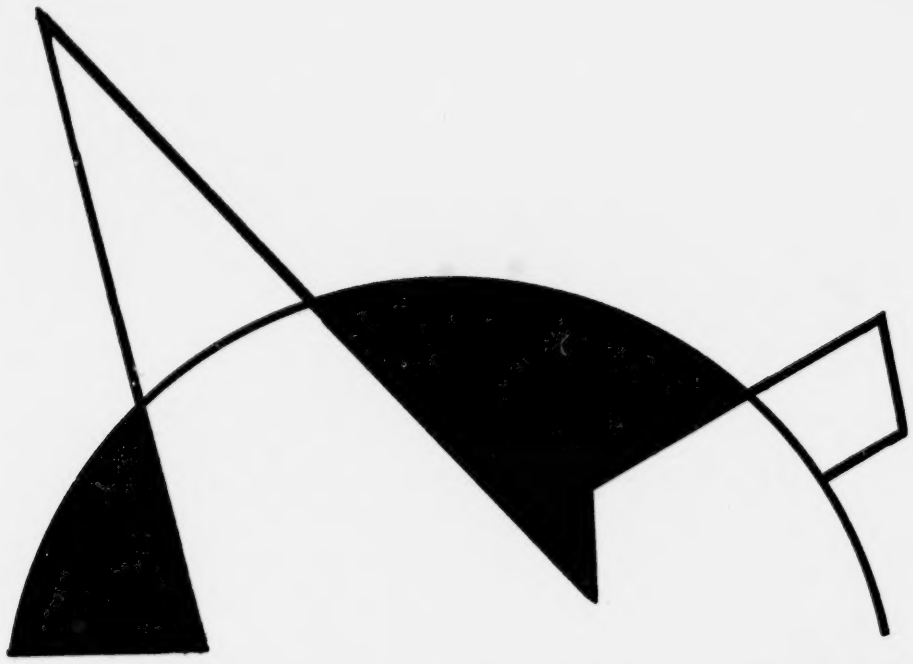
THE INDUSTRIAL ARTS PROGRAM

Industrial arts education provided in the elementary and secondary schools is rich in opportunity to reinforce and apply the content of other school curriculum subject fields. The industrial arts program, by its very nature, is unique for the contribution it makes to the individual's particular needs.

The industrial arts program gives recognition to physical and mental changes taking place in the child at every stage of school life and experiences. It recognizes individual differences, meets demands for educational and social opportunities and provides opportunities for exploration essential to guidance.

The industrial arts program in the Wausau District Public Schools is divided into four (IV) levels and is explained in brief form in the diagram, Levels of Industrial Arts, as shown on the following page.


College
Military
Technical
Vocational
Industry
Terminal
Apprentice
Avocational
Advanced
Education
11-12
(Elective)
Level IV
Advanced Industrial Arts
Unit Shop-Work
in two Areas
(18-26 weeks each)
10-11
(Elective)
Level III
General Industrial Arts
Limited General Shop Experiences
Continued Experiences in Four Areas
based on interest and abilities
(18 weeks each)
7-8 (Required)
9 (Elective)
Level II
Comprehensive (composite) General Shop
Broad Basic Experiences in Each of the Areas Offered
Elementary K-6
(Integrated)
Level I
Drawing Woodworking Electricity Metals Crafts
Printing Graphic Arts Electronics Power Transportation
Planning and Drafting (Foundation for all areas)
LEVELS OF INDUSTRIAL ARTS



Industrial Arts Program

ELEMENTARY

THE ELEMENTARY INDUSTRIAL ARTS PROGRAM

Level I (Integrated, Kindergarten-Sixth Grade)

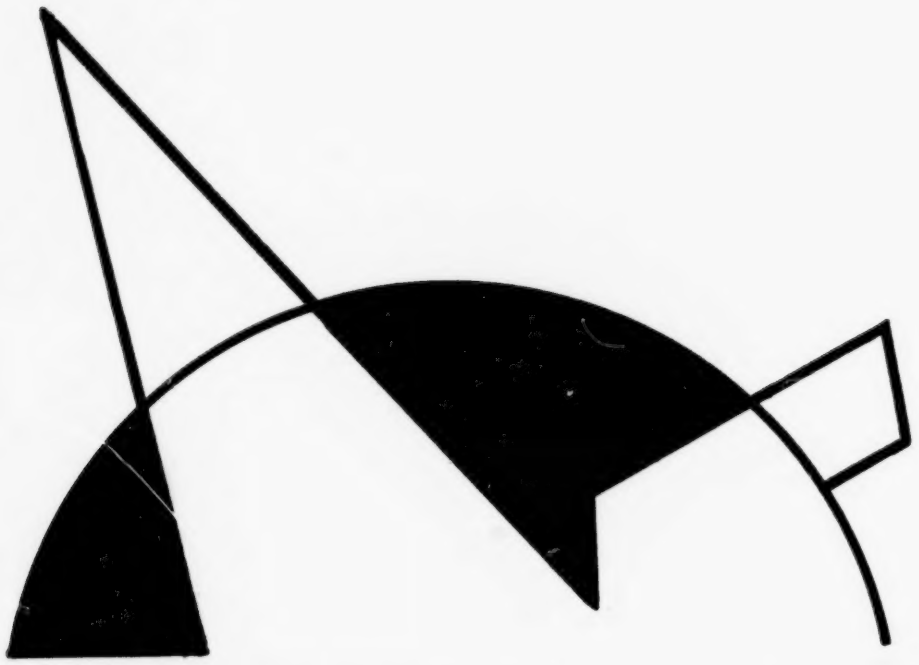
Purpose:

The interpretation of technology and our industrial culture is an important part of the student's general education. Industrial arts has this contribution to make towards the student's learning at the elementary level. The main purpose of the program is to assist in attaining the goals which are set up for the over-all curriculum of the modern elementary educational program.

Anything that can be done to lend real meaning to such terms as hard, brittle, bent, cut, stamp, assembly, mass production, conserving, exploring, experimenting, collecting, constructing and observing can best be done through an integrated program.

Description:

Below the seventh grade level, industrial arts can best make its contribution through group activities by integrating with other subject areas, and thus help vitalize the curriculum. It helps students understand the practical nature of the theory in areas such as communicative arts, social studies, mathematics, and science. Some of these group activities can be: 1) Activities involving the carrying out of an industrial process such as the making of paper, the molding of candles, the shaping of pottery, the making of soap and the churning of butter; 2) Activities involving the construction of mechanical projects such as puppets, musical instruments, working models, recreational games, and mechanical toys; and, 3) Activities involving the construction of non-mechanical projects such as the making of costumes, stage scenery, dioramas, panoramas, and neighborhood maps.



Industrial Arts Program

JUNIOR HIGH

THE JUNIOR HIGH INDUSTRIAL ARTS PROGRAM

Level II (7-8 required, 9 elective)

Industrial arts at the junior high school level is an exploration and discovery program. Students have an opportunity to work in a number of different industrial arts areas to assist them in locating and developing the aptitudes and industrial interests they may have for technical work. At the present time there are five different areas of industrial arts offered at each of the junior high schools. These areas are General Drafting, General Woodworking, General Electricity, General Metals and General Power Mechanics.

The junior high schools have what is called a composite industrial arts program. A number of combinations of areas may exist. This variation is necessary because facilities vary from school to school and instructor experience and preference must be considered.

The seventh grade students begin a two-year sequence with required courses in General Drawing and General Woodworking. In the eighth grade, the student must then take two additional areas from those listed in paragraph one. Industrial arts at the ninth grade level is offered as an elective. Here the student may choose one or more of the numerous combination of courses offered. Because industrial arts experiences terminate for many students at the end of the ninth grade, the course content at this level may vary somewhat to suit the individual desires and needs of the student.

GENERAL DRAWING

Grade Level 7

Purpose:

This required course strives to give the student a basic start in drawing technique while emphasizing accuracy and neatness in every endeavor. It offers the student a basic knowledge of the drawing process that will aid in further study of this important field. The knowledge gained will also assist the student in the reading of plans and descriptions and a means of conveying ideas he may have through graphic representation.

Description:

In the first part of this course the student gains practice in the spacing of various views of objects on paper and lining so as to develop quality of line to be used in further work. The student also practices lettering, making of figures, symbols and arrowheads to gain proficiency in the so-called "freehand" phase of drawing. Later in the course, free-hand sketching and drawing of three-view drawings is used to develop accuracy and neatness throughout the twelve required places, and the sketching of objects on isometric graph paper in order to get the proper relationship between size and shape. The use of drafting instruments such as compasses, French curves and templates aid the students in making those lines other than straight lines. An important part of the course is the related information given to the student that bears directly on the work he is required to do in his daily assignments. This information is also helpful to the student for avocational purposes or if there is thought of continuing in the expanding field of drawing.

GENERAL WOODWORKING

Grade Level 7

Purpose:

General Woodworking is required for all seventh grade boys. It is designed to give the student a basic understanding of the beginning hand tools and their uses. Handwoodworking helps to develop the student's understanding of the fashioning of wood into useful and functional projects. It also helps him to gain self-confidence and to bring about a feeling for careful, safe, and judicious use of the tools.

Description:

Handwoodworking entails much use of various tools and processes involving planing, sawing, chiseling, filing, rasping, and fastening. The student also becomes familiar with some aspects of industry such as production problems, personnel problems, and safety problems. A practical, well-developed project is constructed and a finish is applied to enhance the beauty of the wood as well as to preserve and protect it. Consumer knowledge is gained by frequent discussions concerning types of wood, types of fasteners, types of finishes and the many different kinds and qualities of wood.

GENERAL POWER MECHANICS

Grade Level 8-9

Purpose:

This course is to provide each student with experience of an exploratory nature in the broad field of power and transportation. Also, it is to develop in the student a basic understanding of the principle of power machinery in which the ordinary consumer becomes involved during his daily undertakings around the home.

Description:

Students in this course study the principles of operation and basic theory of the following types of small engines: two cycle gasoline engines, four cycle gasoline engines, gas turbine jet engines, and diesel engines. Information and practical experience are also obtained by working directly with the engines and their accessories in performing general maintenance and repair. Procedure for preparing the engine for winter or an indefinite period of storage is also learned. Comparison and studies of the engines, carburetion systems, magneto systems, fuel systems, cooling systems, and ignition systems are made by the students in the hope that they might help to satisfy some special hobby or interest needs.

GENERAL ELECTRICITY

Grade Level 8-9

Purpose:

In this course the students develop a familiarity with the practical applications and basic principles of electricity. The students come to realize the importance of electricity in our everyday lives and to develop safe work habits along with skills needed to complete simple electrical operations and experiments. This course also contributes toward vocational and avocational preparation as well as fits into the pattern of General Education.

Description:

This is an exploratory course in which the students become familiar with the basic electrical theory. Various fundamental electrical laws are studied. Experience is gained in working with series and parallel

circuits, AC and DC power, AC and DC motors, and low voltage circuit wiring. Students also become familiar with some of the electrical tools, materials, and testing equipment such as the voltmeter, ammeter, and ohmeter. Problems are computed by the use of these instruments. Some work is also done in 110 v. AC such as simple housewiring problems. The students are introduced to some basic work in electronics. When possible, emphasis is placed on the practical implications of the electrical field. Avocation and vocational interests are discussed and elaborated on.

GENERAL METALWORKING

Grade Level 8-9

Purpose:

To become acquainted with the wide field of the metal industries and occupations is one purpose of this course. Further, it informs the students of the varied operations, procedures, and skills needed to become proficient in the metal field. Because of the importance of metals in so many areas of our everyday life, this course stresses the correlation of the various other industries with this field.

Description:

In this course the student uses some of his previous industrial arts experience and skills in reading and constructing working sheet metal layout drawings. Operations, such as soldering, riveting, forming, fabricating, disassembly and assembly are learned during the sheet metal phase. The forging phase of this course includes such operations as water hardening, case hardening, tempering, annealing and shaping. By having the students performing basic exercises and operations in

the gas welding phase, they receive an introduction to another broad area of the metalworking industry. The students are also required to do some minor research into the occupational, technical, and auxiliary information that relates to this vast field. This information is supplemented by class discussions regarding the local metalworking industries.

GENERAL DRAFTING

Grade Level 9

Purpose:

This course gives the student an opportunity to pursue the drafting field beyond the elementary stages. A better understanding of the principles of graphic presentation by further development of drafting skills will be experienced by the student. Further, it is to acquaint the student with a deeper knowledge of the problems of communication and how drafting actually simplifies these problems. It will help the student to become better acquainted with drawing equipment and supplies in preparation for advanced work in this field at the high school and post high school level.

Description:

In General Drafting provision is made to explore as many facts and avenues as possible concerning industrial organization, methods, machines, and materials as well as to learn general skills needed to make and to interpret simple drawings. The student becomes better acquainted with the drafting equipment, procedures and supplies by doing more work in straight line drawing, circles and tangents or curved line drawing, orthographic projection or three-view

drawing, the use of conventional lines, perspective and other pictorial drawings, lettering, dimensioning, and freehand sketching. Drawings consisting of more than one view, such as auxiliary or sectional view drawings, are studied.

GENERAL WOODWORKING

Grade Level 9

Purpose:

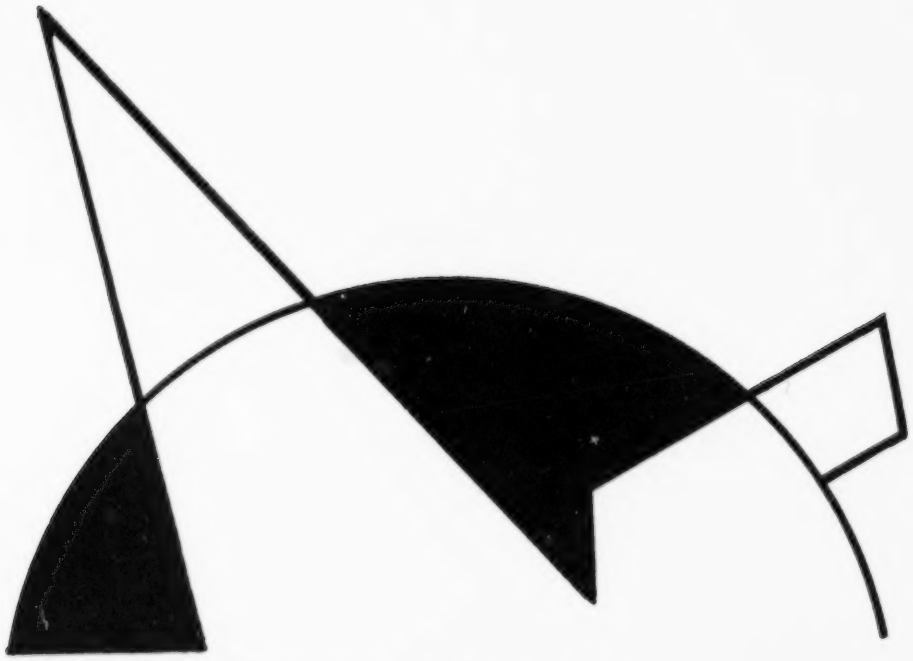
This woodworking course is designed to give the student additional work in the basic machine operations used in the woodworking field. The student who may not continue in the industrial arts field at the senior high level would benefit from this course from an avocational viewpoint. It also instills in the student a basic understanding of the safety procedures used in setting up and operating high speed equipment so that he may be a safer home craftsman.

Description:

In this course the student learns to set up and operate safely the basic woodworking power machines. Care and use of the equipment usually found in the home workshop is stressed. Conservation of materials along with general and technical information relating to this field is discussed throughout the course.

COURSES OFFERED IN THE JUNIOR HIGH SCHOOL

Course Title	Grade Level
General Drawing	7
General Woodworking	7
General Power Mechanics	8
General Electricity	8
General Metals	8
General Drafting	9
General Woodworking	9
General Power Mechanics	9
General Electricity	9
General Metals	9



Industrial Arts Program

SENIOR HIGH

THE SENIOR HIGH INDUSTRIAL ARTS PROGRAM

Level III and IV (elective)

The Senior High industrial arts program further encompasses the basic ideas of general education and also provides the students with an opportunity to specialize toward pre-vocational, pre-technical, and pre-engineering work.

Industrial Arts Major

The Senior High School has what is called an "Industrial Arts Major" classification. If a student chooses to follow this program he would designate on his program schedule Industrial Arts for the first four semesters. He would then be scheduled by the department chairman into two of the four Industrial Arts I courses offered. These courses are one period in length, five days per week, and last for one semester. The two remaining Industrial Arts I courses will be taken by the student during his eleventh year. The twelfth year would be used by the student to broaden himself in one or more of the many specialized areas offered.

The Industrial Arts I courses offered at the Senior High are a continuation of the exploratory phase of industrial arts but are augmented to cover greater depth into the ever-expanding field of occupational, technical, and consumer information. A student may, if he chooses, terminate his exploration of industrial arts at any point and begin to do some specialization, providing he has taken the suggested prerequisites for his chosen special field.

Advanced courses, Industrial Arts II, III, and IV, provide students with an opportunity to specialize in given areas. The offerings at

this level become more pre-vocational and less avocational. Students may here prepare for advanced educational experiences or for employment at beginning levels. Besides relating to semi-skilled and skilled occupations, each of the industrial arts areas relates quite specifically to certain phases of engineering and to other professional or technical fields. This basic understanding of industrial processes and applications would be of great value to prospective industrial arts teachers and to future technical or industrial engineers.

Because individual instruction is characteristic of industrial arts subjects, each student is given work at a level that will challenge his abilities in terms of his past experiences.

Each industrial arts course contains many practical applications of skills from other subject areas. These are presented as an integral part of the instruction. Proper English, composition and speech are incorporated into these advanced courses by having the students do research in a field of specific interest and prepare a report, both oral and written, from the material gathered. Mathematics and science courses in pure or related form are recommended for industrial arts students who are capable and who desire to attend a technical school or college after high school graduation.

Conservation, of both time and materials, is of vital importance to a broad and complete industrial arts program. By closely supervising student progress and by explaining industries' concern and usage of raw materials, it is possible to show the student the real importance of this never-ending problem.

DRAFTING I-A

Grade Level 10-11-12

Purpose:

This basic drafting course aims to establish a good general understanding of mechanical drawing for those students who wish to know how engineers, technicians, tradesmen, and craftsmen communicate with each other. It also gives the student an opportunity to explore the various drafting occupations. Further, it helps students become more proficient in other related occupations such as carpentry, tool and die making, sheet metal work, electronics, and general mechanics.

Description:

The course deals with fundamentals for the first few weeks following which the student has basic experiences in machine, architectural, sheet metal, woodwork, electrical pictorial and freehand drawing.

DRAFTING I-B

Grade Level 10-11-12

Purpose:

The Drafting I-B course prepares the student for the college "engineering graphics" courses which will come after graduation from high school when he is pursuing his college program of studies in the field of mechanical engineering.

Description:

In this course, the student learns basic techniques such as lettering, dimensioning, layout, and arrangement. He studies principles of orthographic projection through the medium of freehand sketching. Following

this, he works on problems in detail, primary auxiliary, sectional, secondary auxiliary, pictorial, and basic descriptive geometry drawings.

DRAFTING II, III, IV

Grade Level (Drafting II) 10-11-12
(Drafting III & IV) 11-12

Purpose:

These courses are for those students who are interested in pursuing drafting as a career. Students who take these courses may specialize in a single field so that they may adequately prepare themselves for future study at technical institutes, trade schools or in the military.

Description:

Drafting II (machine) includes basic units of technical drawing which are described in the college preparatory course, I-B. Added to the drawing, however, the course includes a great deal of related trade content. The III and IV (machine) courses apply the knowledge gained in (machine) II to the drafting of large assembly drawings and original design problems. Also included are units in cam and gear drawings. Drafting II (architectural) deals with structural units of small buildings and houses such as foundations, sills, cornices, fireplaces, cabinets, stairs, and window frames, following which the plans for a small house are drawn. Drafting III and IV (architectural) deal with plans and specifications for popular styles of architecture as they apply to house building in the midwest.

Drafting II (sheet metal) covers applied geometry, true lengths of lines, and problems in parallel line, radial line, and triangulation surface development. Drafting III (sheet metal) consists of apply-

ing the knowledge gained in the II course to solving a wide variety of advanced problems.

ENGINEERING TECHNOLOGY (Drafting)

Grade Level 12

Purpose:

This advanced drafting course is designed for those students who have interests and abilities in science and mathematics which are average or above, and who would like to build a foundation for future education in the engineering technology or the industrial technology professions.

Description:

The emphasis in this course is on technical drafting knowledge, with the development of skills being a secondary purpose. Instead of the usual semester, this course is ten weeks in length and allows about fifty per cent as much time on each phase of the learning areas.

WOODWORKING I

Grade Level 10-11-12

Purpose:

This woodworking course is designed to develop a fundamental concept of the care and use of basic hand tools and an awareness of safe behavior in the presence of shop equipment. It also acquaints the student with the proper operation of all basic power equipment used in the woodworking trade or woodworking industry. Further, by incorporating the information from the other Industrial Arts I courses, it tries to correlate the basic industrial arts areas.

Description:

The first phase of this course consists of knowing and doing units pertaining to handwoodworking. Some basic machine skills are involved in the construction of a project used as the vehicle for this phase. Finishes and their application are included as an important part of the project development and completion.

The second phase consists of performing both basic and complex operations on the following machines that are used in the woodworking field: circle saw, jointer, surfacer, band saw, jig saw, wood lathe, and mortiser. Handpower equipment such as the sabre saw, router, and skill saw are used to some extent to acquaint the student with their performance and function in the construction field.

It should be noted that all students are required to pass a general shop safety test before using tools and, that following the demonstrations, safety tests are given on all machines previous to their operation by the students.

WOODWORKING II, III, IV

Grade Level (Woodworking II) 10-11-12
(Woodworking III & IV) 11-12

Purpose:

These courses are for the students who plan to continue in the woodworking field beyond high school or for those who want more concentration in one area so that they may adequately prepare themselves for one of the trade apprenticeships. A deeper avocational interest is also a reason for student selection of one or more advanced courses.

Description:

The Woodworking II student must plan in detail an advanced or complex project in all aspects. Particular attention is paid to the problem solving and originality of design approach. The student is also required to acquire a knowledge of the operation, maintenance, and repair of the more complex hand tools and power equipment.

All aspects of the woodworking industry, finishing processes, and occupational opportunities are explored further. The student has the opportunity to explore as many of the related fields as is possible to be incorporated into his project design and construction. One area of specific interest is selected for a topic choice and after ample research has been made of the available material, an oral presentation is made to the class.

The Woodworking III and IV student usually has expressed a special interest or ability in a specific part or product relating to the woodworking field. He then explores this area or product by doing research and by working closely with it. The student may choose one or more of the following specific or special interest areas to delve into: fiberglass laminations, wood laminations, furniture building, upholstery, plastic laminations, wood finishing, spot finishing, and some phase of carpentry or cabinetmaking.

A written and a verbal report is made relating to the area chosen. This report is presented to the class and is discussed thoroughly. It is noted that safety practices and procedures are stressed throughout the total program. It is also noted that in most cases Woodworking

II, III, and IV students are scheduled for the same class periods. This, of course, would be somewhat governed by the number of students, their interests and abilities.

ELECTRICITY I

Grade Level 10-11-12

Purpose:

The aim of this course is to acquaint the student with the electrical theory necessary to understand the operation of the common electrical devices and with the common tools used in the electrical trade, as well as to provide an understanding of the operation and structure of the electrical and electronics industry.

Description:

The student will study such areas as Static Electricity, D.C. Theory, Ohm's Law, Generation of A.C. and D.C., A.C. Circuit Theory, and applications of electricity in heating, lighting, chemistry, and magnetism. As a result of the completion of this course, the student will be expected to have a knowledge of electrical theory, to know how to calculate values using Ohm's Law, and to have an understanding of the common home appliances.

ELECTRICITY-ELECTRONICS II & III

Grade Level 11-12

Purpose:

The purpose of these advanced courses is to provide the student with an opportunity to continue work in the field of electricity-electronics. They will provide not only technical knowledge, but also the background for pre-vocational training and/or avocational interests.

Description:

Electricity-Electronics II is a continuation of Electricity I and includes such study areas as elementary radio theory; operation of the vacuum tube diode, triode, tetrode, and pentode; circuit applications of the vacuum tube such as in oscillators, amplifiers, and power supplies. It includes construction of a five-tube radio receiver that is paced to follow along with the theory being studied. In Electricity-Electronics III the student will study such areas as mathematics related to electronics, more advanced electronic theory, and industrial applications of electronics. He is permitted to make a project of his own choice, subject to the approval of the instructor. When the student completes this course he will be expected to understand the relationship of electronics in industry and to understand the operation of such devices as a photoelectric counter, capacity-operated relay, and gas tubes.

ENGINEERING TECHNOLOGY (Electricity)

Grade Level 12

Purpose:

Here the pre-engineering student will be provided with a basic understanding of the practical side of electronics, enabling him to better work with the production side of industry when he completes his engineering degree.

Description:

In this course the student will study such areas as vacuum tube theory, circuit applications of vacuum tubes such as in detectors, oscillators, amplifiers, discriminators, oscilloscopes, and transmitters. He will

do experiments and will also construct a term project of his own design and will demonstrate its operation to the class.

METALWORKING I

Grade Level 10-11-12

Purpose:

This course enables the student to examine very closely the broad field of metalworking. He gains a basic understanding of the proper care and use of all metalworking hand tools and through close relationship develops a high regard for safe procedures when using power equipment distinctive to the metalworking industry. Further, by presenting technical, general, and occupational information, the student becomes more familiar with the opportunities available. This course also correlates the information from Industrial Arts I courses, thereby justifying their close interrelationship.

Description:

Metalworking I presents on the exploratory level, three of the areas of the metalworking industry: oxyacetylene welding, sheetmetal, and machine shop.

Oxyacetylene welding deals with basic safety and setup of the welding torch and manifold. Practice welds are made of the following types of joints to teach advantages and limitations of each joint: corner weld, bead weld, lap weld, brazed tee weld, and butt welds for testing a face and root bend.

Sheetmetal deals with basic and complex operations on the following machines that are used in the metal industry: bar folder, box

and pan brake, squaring shear, and rotary machines such as the turning machine and the wiring machine. Gas furnace and blow torch means of soldering are presented. A complete line of hand tools are used along with operations such as riveting, wiring, double seaming and grooved seaming. The construction of a sheet metal project is used to teach the parallel line method of pattern development.

Machine shop deals with both basic and complex operations on the engine lathe, power hacksaw, drill press, and pedestal grinder.

All students are required to pass a general shop safety test before using tools or machines. Following each demonstration on a machine or danger area new to the student, the proper safety test must be passed.

METALWORKING II

Grade Level 10-11-12

Purpose:

This course is for the student who plans to continue in the metalwork field beyond high school or for those who want more concentration in one of the previous Metals I areas or in a new Metals II area so that they may adequately prepare themselves for one of the trade apprenticeships of one or more advanced courses.

Description:

Metalworking II presents two additional areas of the metalworking industry: forging and foundry. In addition, the course presents advanced work in sheetmetal and machine shop and layout.

Forging deals with basic safety and operation of the gas forge. The hand tools used and the operations learned progress from the blacksmith era to modern methods of forging and heat treating. Operations such as drawing, upsetting, chamfering, normalizing, annealing, casehardening, hardening and drawing temper are used in this course.

Foundry deals with basic safety and operation of the gas furnace. Further, the course consists of the history of foundry, tools and equipment, fundamental processes, patterns, sand molding, sand cores, melting and pouring, and cleaning and finishing castings. The students ram the following patterns: one piece regular parting, one piece irregular parting, split, figurative, green sand core, and baked sand cores.

Sheetmetal deals with more advanced setups and operations of the standard machines used in this industry. The parallel line method of line development for cylindrical fittings is used. Advanced seaming, beading, and folding operations are incorporated. Students with greater potential are presented triangulation and radial line development problems as an added challenge.

Machine shop deals with basic safety and the proper operation of the shaper and horizontal milling machines plus advanced drill press, surface plate layout, and inspection work. A written and an oral report is made relating to any area of the metalworking industry. This report is presented to the class and discussed thoroughly.

METALWORKING III AND IV

Grade Level 11-12

Purpose:

These courses are set up to require individual problem solving with a minimum of teacher-initiated presentations. These are above and beyond the material already presented to the student in the previous two metals courses.

The student has an opportunity to originate, design, and construct a project on his own. The various phases of design will be presented to the class, but each student will be working on his own project. There may be any number of advanced specialized units of learning that will be necessary for an individual student. Each student will draw on his past technical knowledge and skills in the entire metals field.

Description:

These advanced metalworking courses present electric arc welding as a required new area and art metal as an optional area.

Arc welding deals with basic safety and setup of the welding machine and cables. Practice welds are made of the following types of joints to teach advantages and limitations of each joint: five bead welds on sheet stock, spread weaved bead, current-speed-arc length exercise, flat corner joint, horizontal lap, build a boss, and build up a journal.

Art metal deals with a variety of operations performed on non-ferrous metals such as aluminum, copper, and brass. Operations to be covered include spinning, enameling, etching, raising, fluting, planishing, chasing, and brazing.

ENGINEERING TECHNOLOGY (Metalworking)

Grade Level 12

Purpose:

Here the pre-engineering student co-ordinates the theoretical phase of engineering with the vital manipulative experiences by providing an opportunity to apply the mathematics, science, physics, and other subject matter which he must have to become a well-rounded engineer.

Description:

This metallurgical course offers the student practical experience in all of the following fields: welding, foundry work, and machine shop. These experiences will be of a manipulative nature as well as theoretical and will relate directly with the other phases of the engineering program.

PRINTING

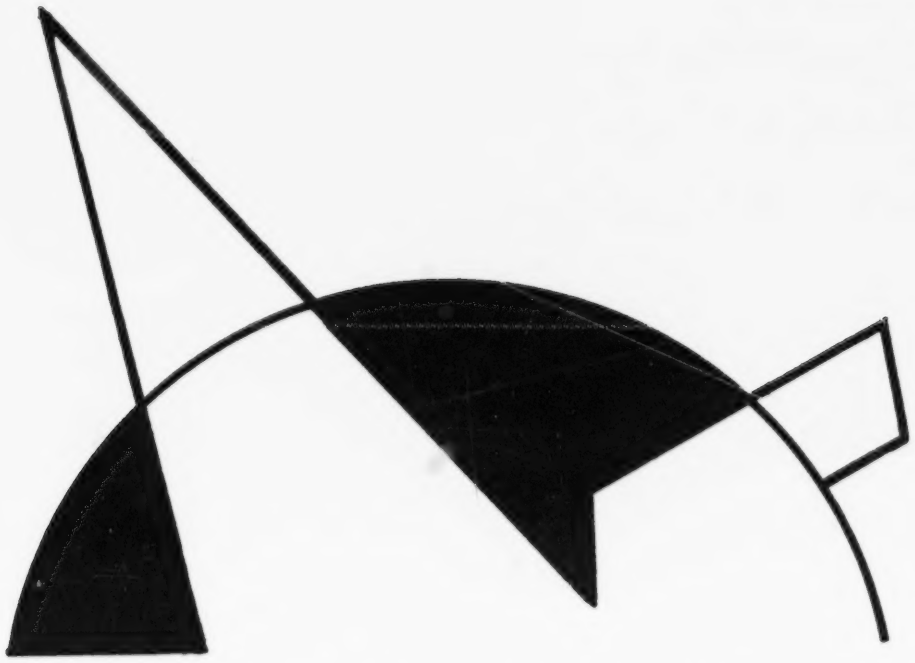
The field of graphic arts is one of our nation's largest industries. Our printing course enables the student to gain some experience in what he has to know and do to gain employment in some of the areas of graphic arts. Units which are covered include hand composition, imposition and lock up, platen press work, proper handling of paper, Miehle press work, and shop safety and health.

AUTO MECHANICS

Auto Mechanics is open to seniors only who have previously had at least one semester of general metals. Areas which are covered include servicing, maintenance, washing, lubricating, tire repair, nomenclature of parts, electrical system, and motor tune-up.

COURSES OFFERED AT THE SENIOR HIGH SCHOOL

Course Title	Grade Level
Drafting I-A	10-11-12
Drafting I-B	10-11-12
Drafting II	10-11-12
Drafting III	11-12
Drafting IV	11-12
Engineering Technology (Drafting)	12
Woodworking I	10-11-12
Woodworking II	10-11-12
Woodworking III	11-12
Woodworking IV	11-12
Electricity I	10-11-12
Electricity II	10-11-12
Electricity III	10-11-12
Engineering Technology (Electricity)	12
Metalworking I	10-11-12
Metalworking II	10-11-12
Metalworking III	11-12
Metalworking IV	11-12
Engineering Technology (Metalworking)	12
Printing I	12
Printing II	12
Auto Mechanics I	12
Auto Mechanics II	12



Future Trends In Industrial Arts

FUTURE TRENDS IN INDUSTRIAL ARTS

The philosophy and purposes of industrial arts has stood up to the test of general education philosophies over the years and its program has become an integral part of the American Educational System. The direction this program takes in the years ahead, therefore, will not have to do with changes in philosophy or purposes, but rather on the degree of emphasis given certain purposes and on changes and additions to course content dependent upon the needs of the student and the needs of society.

Present trends indicate that some of these changes will emerge along the following lines:

1. Courses which deal with preparation for service occupations will receive more attention. This will be due to the impact of automation.

2. The vocational and college preparatory purposes will receive heavier emphasis during the later high school years.

3. Some correlations of mathematics, science, and industrial arts programs will be developed to meet the needs of future engineering and industrial technicians. Big shortages of trained men in these fields is predicted in the years ahead.

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NOTES AND COMMENTS